October 7, 1963

NOTES 10-7-63 BELEW

J-2 ENGINE: Test stand activation dates for the Delta 2B and Delta 2A positions are October 22 and November 5, respectively. This additional 4-day delay is due to finding water in the LH_2 tank. This delays the initiation of Block III engine testing and consequently, makes a tighter schedule to initiation of PFRT. Thirteen tests were conducted this period for a total run duration of 300 seconds.

H-1 ENGINE: S-I-7 was fired for the programmed 35 seconds on October 3. A pre-test check showed slight fuel pump-to-gearcase seal leakage in seven of the eight engines. It was decided to go ahead with the tests, which proved to be fully successful from the engine side. A redesigned seal will be incorporated on SA-113 engines.

During a meeting this week with P&VE it was decided to proceed with limited redesign of the engine to prepare for 200 K operation. This will provide extra safety margin if we stay with 188 K.

Results of Dr. Mueller's Schedule Review Thursday, October 3, indicated that this type program will be rather difficult to sell.

F-1 ENGINE: Negotiations between MSFC and Rocketdyne were held last week on the Accelerated Dynamically Stable System Program (DSSP). The estimated cost of the new scope effort agreed upon was $12.0 M. Also negotiated was the addition of the Electrical Interface Panel ("Dishpan") to the engine package. The estimated cost for this item was $1.4 M. Total fee negotiated for this change was $871,000 (approximately 6.5%).

Engine F-1001 has been shipped to EAFB for the acceptance series of tests. If all goes well, the engine will arrive at MSFC in late October or early November 1963. A representative of Test Division is living at ERB following the acceptance of this engine.

RL10 ENGINE : The impact of deletion of the requirement for RL10 engines for operational Saturn I vehicles without retention of production of some engines for applications such as the S-VI stage, is as follows:

1. There are considerable costs which have already been committed against the procurement of these engines since there is a 13 month lead time for engines. The result will be an apparent increase in cost per engine delivered.

2. Production of RL10 engines at East Hartford, Conn. may have to be terminated in favor of the manufacture of engines at Florida to reduce overhead costs for lower production rates.

NOTES 10/7/63 CONSTAN

1. S-IC QUARTERLY REVIEW

The S-IC Quarterly Review will be held in Huntsville this week - October 9 and 10.

2. VISIT OF HEADQUARTERS PERSONNEL

Col. R. J. Kasper, Deputy Chief, Office of Construction, NASA Headquarters visited Michoud on Thursday, October 3, for a general briefing and tour of the Michoud Facility. Mr. Gordon Dykes and Col. Charles Palmer of the Marshall Facilities Office accompanied them. After visiting Michoud in the morning they left to visit the Mississippi Test Operations in the afternoon.

B 10/9

NOTES 10-7-63 DANNENBERG

The Saturn/Apollo Systems Office took up official operations on 10-1-63, and will concentrate activities in the following areas:

- Interface problems
- Documentation and establishment of requirements
- Man rating problems.

The following actions have taken place:

1. Discussions with Dr. J. Turnock and associates finalized the GE Work Statement. A list of check-out hardware was established, and will be made a part of Section I (umbrella clause) of the GE contract. The Scope of Work is principally written for continuation of existing GE efforts. Only a minor increase of shop activities in Daytona is included.

2. A meeting of all Working Group Chairmen and Secretaries was held 10-1-63. An interim Charter was tentatively agreed upon and will be discussed with Industrial Operations for finalization in the near future. The main changes in this Charter are mandatory IO representation, and provision for the R&D Operations Director to name new Working Group chairmen as required.

3. A meeting with Mr. Sprott -- who was here on behalf of Mr. Selvaggi -- discussed existing documentation problems. Existing documentation was presented to the OMSF group. MSFC recommendations as to usefulness and continuation of the various types of documentation were presented. OMSF will take this subject up after the presented material has been reviewed.

4. MORL Study - MSFC inputs for launch vehicles and propulsion are being generated and collected for submission to OMSF by 10-8-63.

5. Apollo - The preliminary EDS specifications for both Saturn IB and Saturn V have been determined and are being prepared for publication and distribution.

6. Mercury Summary Meeting in Houston - The "Development and Performance of the Mercury-Redstone Launch Vehicle" was presented by Dr. Kuettner and Mr. Bertram, LOC.

NOTES 10-7-63 Stuhlinger

B 10/9

1. FY-64 SUPPORTING RESEARCH: Program authority from OMSF has been received in the area of Launch Vehicle Supporting Technology. Out of a total funding requirement of 13.2 million dollars, only 5.014 million dollars have been received for our supporting research projects. Attempts on our part continue to obtain additional funding for our FY-64 Research Program in this area.

Request a 2 or 3 page breakdown on what's approved and what isn't. B

2. APPROVAL OF ADDITIONAL FY-64 TASKS: A meeting between 3 members of OART, 3 members of OMSF, and members of P & VE, ME, and RPL was held at MSFC on October 3 as an attempt to obtain FY-1964 funding for a number of tasks in the area of tank structure development (manufacturing and testing methods, insulation, etc.). All these tasks were tentatively approved for funding by OMSF, but held up by OART, although these tasks should also be of interest to OART ("advancement of technology"). It appeared to us that our presentations were favorably received, and that we may expect a re-consideration of our requested research program in this area by OART. ✓

3. ASSISTANCE TO COLLEGES: Dr. Nat Edmonson, with 15 years of collegiate teaching experience, has been visiting several Negro colleges, including Talladega and Stillman, in discussions with educators on ways to improve the mathematics and physics curricula. ✓

Fan 10/7

B 45/3

NOTES 10-7-63 FORTUNE

1. Your Visit to Gulf Coast: Very favorable press and television coverage resulted. Mr. Shattuck has been flooded with requests for copies of your speech. He has also sponsored a resolution by the Mississippi Rural Electric Consumers Association, urging support of our Nation's space program. ✓

2. Speech Requests Again on Increase: So far we have twelve speaking engagements scheduled for October including one I am to give to several hundred colored county agents from all over Mississippi under a cooperative extension service supported by Mississippi State University and the United States Department of Agriculture. ✓

*Jw 3. President's Missile Site Labor Committee to Meet Here: Thursday, October 10, the committee will meet at the Broadwater Beach Hotel to form an MTO branch. John Miraglia from Michoud and Jim Chamberlin, Corps of Engineers, will be our members, with local representatives from Gulf Coast Contractors Association and the Unions. ✓

4. Operation of Concessions by the Blind: The State Department of Public Welfare sent representatives down to discuss this. We satisfied them that it would be given due consideration when our facilities become operational. ✓

5. Certificates of Eligibility for Housing: The President signed the bill giving us authority to issue Section 809 and 810 Certificates to the essential employees. We need definition of latter and assistance in establishing procedures.

Harry G.
B

B 10/9

NOTES 10/7/63 GEISSLER

1. Saturn I and IB Inner Engine Turbine Exhaust: Discussions have been reopened on potential redesign of S-I and S-IB inner engine turbine exhaust system, to reduce vehicle weight. P&VE considered 4 alternatives: #1. Present design, #2. "Partial" exhausterators, #3. Submerged ducts, #4. Exhaust through flame shield. R-AERO considers #2 and #3 as inadvisable. #2 saves about 530 lbs dry weight at the expense of a marked increase of base heating; the saving is too small to warrant the chance taken by this considerable deviation from a well-tested design. #3 will have a smaller effect on the base environment, but weight savings, if any, are more or less cancelled by drag of the exhaust pipes that protrude into the H-1 jets. Full ground testing is not possible due to ballooning of the jets with altitude. #4 is the only promising alternative to #1, it may save about 1300 lbs weight, and may add about 700 lbs exhaust thrust. (Additional thrust equivalent to 250# dry weight or 26# payload in Saturn I, and 315 # dry weight or 41# payload in Saturn IB.) You had proposed this around 1958-59, but the idea was shelved because it was feared that extreme radiation expected on the flame shield would enter and deatroy the mouth of the exhaust pipe. The 4 flight tests have meanwhile shown that this fear was groundless. We believe that Aero and P&VE are essentially in agreement on the merits of these solutions.

Willy Mrazek – So AERO does not like submerged ducts. Do you go along with #4 instead? B

2. S VI/MMM Presentation in Washington: In the Saturn V Meeting on Oct. 8, you will get a short status report about the 504/505 reentry problem and its SIB implication. We need about 2-3 more weeks to finalize our data, if we want to include the gains which can be realized from 200 K thrust level for H-1. As you know, MSC is rather hostile to SIB reentry - they argue they don't want to tie the Apollo program to a new stage. Maybe part of their concern is that we might want later to get control over their SM (cryogenic SM). This may be alleviated by stressing the propulsion module concpt rather than the multiple use stage. Since our chance of selling the MMM reentry vehicle per se is not very good, we wonder whether it might not be advisable to go to Washington a little later with a description of many attractive uses of the MMM beyond Apollo reentry and Voyager, such as Lunar Logistics Vehicle, Cryogenic Service Module, direct manned lunar flight, Gemini Circumlunar Flight, Synchronous Satellite, 4th stage on Saturn V, orbital stage with large maneuverability, etc. This could be done in early Dec. We could then add to the demonstration of technical possibility some reasonably specific data demonstrating the cost savings in R&D and in Operational Use accruing from multiple application of our space propulsion module. Maybe we can obtain your guidance on this at the Saturn V meeting on October 8. Agree completely! B

E.F. Which is baloney, of course! B

E.F.

3. Mission Control Operations Panel (MCOP): An MCOP meeting was held at MSC on Oct. 2, 1963. The primary issue was the definition of the joint MSFC-LOC support for S-IV-B/IU Orbital Operations in the Apollo Program. Mr. Walt Williams and Mr. Chris Kraft were present. MSC agreed with the MSFC contention that remote support to the IMCC is required but did not commit themselves to the extent of the support proposed. The problem between LOC and MSFC as to where the focal support point should be located was not resolved. However, Mr. Kraft expressed his doubt that LOC realized the magnitude of the job and he openly favored the MSFC proposal. Dr. Speer requested an official MSC opinion on both proposals within three weeks. MSC will probably not wish to make a firm decision for either proposal but they expect LOC and MSFC to resolve this question. This office is preparing material for an LOC-MSFC Management Meeting.

NOTES 10-7-63 GRAU

1. S-I-6 POST-STATIC CHECKOUT: Inadequate cable identification resulted in reversing two umbilical cables during hook-up for Simulated Flight Test, and power supply damage occurred when power was applied. Plastic identification tags are being affixed to all cables to prevent recurrence. Vehicle schedule will not be effected.

2. S-IU-6 FINAL CHECKOUT: Control Overall Test has been satisfactorily completed. The vehicle is now in Guidance and Control checkout.

3. S-I-9 PRE-STATIC CHECKOUT: Manufacturing Engineering Laboratory released S-I-9 to this laboratory on September 30, 1963. Vehicle is undergoing preparation for Pressure and Functional Test in the pressure cell of building 4705.

4. S-IV-5 VEHICLE STATUS: Modifications continue in the Special Assembly Building at Launch Operations Center. Erection date of October 11, 1963, appears to have slipped due to the assembly and rework necessary.

5. S-IV-6 VEHICLE STATUS: Vehicle S-IV-6 was received at SACTO Friday, September 30, 1963, and erected on the test stand Monday, September 30, 1963. Preparations for completion of assembly and for pre-static checkout are in process.

NOTES 10-7-63 GRUENE

SA-5 Scheduling: A scheduling meeting was held with DAC on October 4. It seems possible that the present "mate date" of October 11 can be met by DAC despite delays of incoming hardware. Doubtful areas include:

a. Hydraulic oil contamination check was run on October 4. Final results of the test will be completed by October 7 or 8. If oil is found contaminated, investigation of other engines may become necessary which could affect "mate date."

b. Doubtful further developments of Hurricane Flora.

Jan 19 72

NOTES 10/7/63 HAEUSSERMANN B 10/9

No submission this week.

NOTES 10/7/63 HEIMBURG

1. S-1-7: The stage was successfully fired for the intended duration of 35 seconds on 10/2/63. Post-firing inspection showed a split tube in the combustion chamber on engine position 2. This engine will be replaced with a spare engine prior to the next firing, which is scheduled for Thursday, 10/17/63.

2. F-1 ENGINE (STATIC TEST TOWER WEST): Equipment installation is virtually completed on this test stand. A minor problem is anticipated in the installation of the tank and suction line, since this will be the initial "fit-up" of this equipment. However, no delay in the test program is envisioned as a result of the aforementioned problem. [Photographs of the test stand showing installation (for checkout purposes) of the mock-up F-1 engine are attached for your information.] omit from TWX

The first F-1 engine, designated for MSFC, was fired at Edwards Air Force Base on Saturday, 10/5/63, for the initial run. Intended duration of 20 seconds was achieved. Preliminary information indicates that the thrust level was low; however, this was intended and does not represent an engine malfunction. Estimated delivery to MSFC is 3 to 4 weeks from this date.

3. SWING ARMS (LC-34): Acceptance testing of the LC-34 umbilical swing arms was completed on 9/24/63.] The GH_2 vent coupling on arm 3 has not proven to be reliable in that the secondary release system will not disconnect the coupling, should the arm hydraulic system fail and icing conditions exist. Recommendations have again been made to LOC for a redesign of the coupling.

4. MARINE TRANSPORTATION, BARGE DESIGNS: U. S. Coast Guard approval has been received on the cryogenic barge designs as proposed by Test Laboratory. Design work has been initiated on the West Coast barge and the MTO-Michoud stage "shuttle" barges.

5. MTF WORKING GROUP: As of this date, 10/7/63, the status of contracting for the MTF is summarized below:

Procurement Office	Number of Contracts	Amount
Mobile District Corps of Engineers (MDE)	19	$15,254,611.00
MSFC-P&C	1	$18,254,800.00
TOTALS	20	$33,509,411.00

Mobile District Corps of Engineers has scheduled bid openings by 11/5/63, for an additional $27,000,000.00 worth of construction work.

ATTACHMENT:
3 Photographs (NOTE: These photographs are attached to Dr. von Braun's copy only.)

Fw 10/7

B 10/9

NOTES 10-7-63 HOELZER

*Fw 1. COMPUTER INSTALLATION BUILDING 4491: The second 1410 computer arrived last week and is being installed.

fw 10/7

B 10/9

NOTES 10-7-63 JAMES

1. SATURN I: SATURN I OPERATIONAL PROGRAM CURTAILMENT STUDY - Preliminary study by Project Office, confirmed by P&VE, indicates that S-IB-1 and S-IB-2 can be of planned configuration, on schedule, using all of S-I-111 and S-I-112 hardware except spider beam, fins, and such unneeded items as H_2 vents and LOX-SOX system. Study will be completed and results presented on 10-14-63.

*fw 2. SATURN IB: S-IB MODIFICATION TO CCSD CONTRACT - This action has been in Headquarters since August 22. It adds the S-IB stages to Chrysler's contract, and deletes S-I stages after S-I-116. It would be extremely unwise to lump this with the SATURN I termination if approved. We negotiated a very satisfactory base for deletion of S-I's, and would certainly lose ground if this had to be totally renegotiated in a termination atmosphere.

3. S-IVB: S-IVB QUALIFICATION PROGRAM - Final comments from the Divisions and Offices concerned with parts qualification on the S-IVB stage were received during the week, and a final draft of the scope of work is being completed in this office. The qualification program was discussed informally with Mr. Reaser of DAC during the week, and the formal release to Douglas is expected within the next week for submission of component qualification list and ROM figures. The original ROM figure submitted by DAC for this scope of work was $13 million and was in addition to present contractual requirements. The cost of revised qualification program should be less than the original $13 million.

Lee J
What's that?
B

S-IVB RELIABILITY PROGRAM - Personnel met with representatives of S-IVB DAC and MSFC Reliability Office to establish ground rules for preparations of reliability work statement with schedule completion date of December 1, 1963. Mr. E. S. Smith of M-QUAL has full responsibility for completion of this work statement prior to a technical directive being issued by this office. This area of reliability was originally submitted by DAC with a ROM figure of approximately $23 million and was in addition to present contractual requirements. DAC will resubmit the cost estimate with the new work statement requirements for review by this office.

NOTES 10-7-63 Koelle

1. SPACE LABORATORY STUDIES

The momentum for the space laboratory project is picking up. The AF has issued RFP's to industry for three studies totaling $1,000,000. How seriously industry is taking this is illustrated by Elmer Wheaton, a Vice-President at Lockheed who is personally heading the proposal effort.

I will go to Washington this week to participate in a NASA presentation to PSAC (Dr. Lester Lee's subcommittee) on the subject of the Space Lab. I will give a 30-minute presentation on Advanced Orbital Operations.

We will keep our in-house studies going strong and should be ready for a presentation to you late in November.

2. NUCLEAR PULSE VEHICLE CONCEPTS

We had our mid term review of this study with GD/General Atomics a week ago. The concept is still one of the best future space transportation ideas with a low obsolescense rate. It will be two months before the final report (Phase I) will be presented here. We will make the date of this presentation compatible with your schedule. We expect to receive up to $250,000 from OART to continue with conceptual designs after Phase I. We will probably have to do something before this year is over. The problem is that DOD will not fund supporting research in this area unless NASA shows some official interest. I envision an official letter on this subject to Dr. Seamans from you in about two months, in case the concept still looks promising to us.

3. EARLY MANNED PLANETARY FLIGHT IN-HOUSE STUDY

We are ready to move out on this small in-house study, which is based on SATURN V hardware. The draft of the guideline has been sent to you for approval.

fw 10/7

NOTES 10-7-63 KUERS B10/9

*fw 1. Saturn I, S-I Stage:

a. Assembly of SA-9 has been completed on schedule. This stage was turned over on October 1 to Quality for check-out prior to static firing. ✓

b. The 154" Instrument Unit structure of the new unpressurized design has been completed. ✓

2. Saturn V, S-IC Stage:

a. We completed the dollar-piece weld on the lower fuel bulkhead and are preparing to weld this lower bulkhead to the cylindrical skin assembly. ✓

b. Baffle ring installation on the upper fuel bulkhead plus skin assembly is complete. This sub-assembly is now being zink chromate painted. ✓

3. Saturn V, S-II Stage: The 12 gores required for the first aft common bulkhead have been welded (Apex to base segments). This first common bulkhead is being built for structural load testing. ✓

4. Leakage Problem on Tube Connections: In order to overcome our age old leakage problem on tube connections we have obtained a complete portable Induction Brazing System, developed by Aeroquip, for brazing of stainless steel tubing to fittings, unions, tees, etc. The brazing tool itself is very small so that it can be used for installation on the vehicle. The cycling of heating and cooling is fully automatic. MacDonnell Aircraft Company is using this system for the Gemini Capsule. Debrazing for disassembly purposes is also possible. We have started a qualification program jointly with P&VE and Quality Laboratories. ✓

NOTES 10-7-63 MAUS

B1019

No Notes.

Fw 12

B 10/9

NOTES 10-7-63 MRAZEK

1. SATURN V APOLLO REENTRY TEST: Based on the estimated R&D weights for Saturn V vehicles SA-504 and SA-505, a preliminary performance analysis indicates that these vehicles can fulfill the requirements for the Apollo Reentry Test. The trajectories ran assumed a launch azimuth of 90°, but otherwise followed closely the flight profile designated for the Lunar Orbit Rendezvous mission during the first and second stage burns. For this test, the S-IVB stage continues to burn to injection into an eccentric parking orbit which allows approximately two hours of coasting between the first and second burns of the S-IVB. Two minutes of coasting were allowed between the second cutoff of the S-IVB and initiation of reentry to allow for separation and orientation of the Apollo. It is yet to be determined whether this profile would severely compromise the qualification tests planned for vehicles SA-504 and SA-505. ✓

2. NEW LIGHTWEIGHT CABLING: (Reference NOTES 9-23-63 MRAZEK, paragraph 2.) The new cabling will be used on the S-IVB stage. Application on S-IC stage is being studied. Fichtner has no requirement for semi-armored cable, however, he does not oppose present plans for installation of the cabling. ✓

*Fw 3. S-II STAGE INSULATION: Space and Information Division, North American Aviation, Inc., has pursued a retrofit concept (additional insulation applied on top of present 0.8-inch thickness) which will delay S-II-2 and S-II-3 approximately two months. Therefore, the retrofit concept has been abandoned. A solution to the insulation problem is to increase the insulation thickness to approximately 1.5 inches in order to complete the mission. Propulsion and Vehicle Engineering Laboratory studies of alternate insulation concepts for S-II-4 are continuing under top priority. ✓

*Fw 4. STATIC TEST OF S-I-7 CONDUCTED SUCCESSFULLY: Test duration was 35.1 seconds. All vehicle systems performed satisfactorily. The thrust chamber tube cracked on Engine No. 2. Engines No. 1, 4, 6, and 7 operated above the 188K ± 3% thrust limit. The cracked thrust chamber tube may be repaired and a sea-level reduction will be made of engine performance, including an investigation of the four engines that were out of the thrust specification. ✓

5. TRANSFER OF 260-INCH SOLID MOTOR PROGRAM TO NASA: Reports from NASA Headquarters (Cohen and Wasel) indicate that FY-65 funding for the 260-inch large solid motor technology program will be a part of the NASA budget. Dr. Brown of the Department of Defense has reportedly agreed to the transfer, and is planning to release a letter to NASA to this effect as soon as the Air Force completes negotiation of the FY-64 funds. This program has been discussed internally with personnel who have been in close contact with Cohen and Wasel, and we strongly feel that we should actively seek assignment of the program to MSFC, specifically the R&D, both for management and technical direction. Cohen and Wasel have expressed considerable appreciation for the support we have given them in other solid propulsion technology programs. Their main concern at this time is that the large solid motor technology program, if assigned to MSFC, be given adequate management support as demonstrated by organizational structure and that funds for the program not be reallocated to some other program. A letter to Dr. Mueller is being prepared for your signature.

L.M.

How many people, total, are needed to handle this program adequately at MSFC? B

Attachment #1: NOTES 9-23-63 MRAZEK

NOTES 10-7-63 RUDOLPH

1. S-IC: New Ground Rules pertaining to Technical Directives have been furnished all Working Group Chairmen and Boeing. These will reduce correspondence and response time, yet provide more complete information.

S-IC-T Task Force Action Item 2 (The complete instrumentation requirements) has been furnished Boeing. Of 22 items considered, 15 are completed. Next meeting will be Oct. 8.

A Phase I Review of the S-IC Test and Checkout Complex was held and documentation therefrom is being reviewed.

Proposed weight savings design changes have put a hold on procurement of the affected materials for S-IC-S (primarily Thrust Structure area) to minimize schedule impact. It may be necessary to defer major weight savings type design changes until S-IC-F.

The Center Engine Support Tooling has been installed in building 4707.

2. S-II: Action is being initiated to establish an S-II GSE Coordination Group to look at the total S-II GSE picture. During October through February 1964, S&ID will prepare proposals for changes updating the approximately 192 end items of GSE to current status.

Amendment 5 negotiations were completed Oct. 1 for a cost of $11,640,836 and fee of $735,000 - a total of $12,375,836. This represents a reduction from the figure of $20,987,237 originally proposed by S&ID.

Shiff Construction Company was awarded contract for the pneumatic, paint and packaging building and the structural static facilities at Seal Beach.

3. S-IVB: A $3 million deficit for FY 64 facilities funds now exists. S-IVB R&D funds of $535,000 will be used to satisfy immediate needs.

TAPCO is to continue efforts to meet SATURN V/S-IVB stage attitude control requirements. (Applies also to Saturn IB)

Rocketdyne was recommended for selection to develop the 150 lb. ablative motor for Saturn V/S-IVB stage ullage application. (Also for Saturn IB.)

Tooling for the assembly tower at Huntington Beach has been received and checked out. Installation began October 3.

Beta One is about 70 per cent complete; all structural work is done except for installation of weigh bridge, crane, and folding platform.

Beta Three has concrete work complete and structural steel up to 60-foot level. All structural work is complete on test control center. All to be complete by Nov. 1.

4. Instrument Unit: Dr. Seamans has signed procurement plans for the IBM Instrument Unit Systems Integration effort and the Advanced Guidance Computer and Data Adapter.

5. GSE: At MSFC meeting on September 30, to discuss the FY 64 budget and GE, OMSF requested list of items from MSFC to be included in the work statement of the GE contract in lieu of the existing contract language which indicates GE responsibility for the entire "ILCCS." This apparently satisfied the requirements of the Turnock group.

NOTES - 10-7-63 - SHEPHERD

FY 65 C of F Budget: On 2 October, the Office of Programs deleted approximately half ($18M out of $37M) of the C of F projects requested for Huntsville (see last column in attachment). We submitted a TWX reclama on 3 October for all projects which had been deleted, indicating that you would discuss the items with Dr. Mueller at an early date. A briefing memo will be available on 10 October for your discussion with Dr. Mueller.

Rate of Obligation of C of F Funds: Reference notes 9/30/63 Shepherd. We have clarified the data presented by Long at the Facilities Managers Conference and are still attempting to validate the comparison of obligations versus appropriations for MSFC. Preliminary results of our review for all C of F funds appropriated through FY 63 show that MSFC has obligated 77.7% of its appropriated funds as compared to a NASA average of 65.4%.

Long's Office: Bob Long has employed, and assigned to the West Coast, a permanent representative of his office with the title of Director of West Coast Operations. Mr. Blu Sloan, a former employee of the Long Construction Company has been chosen to fill this position and is located in the WOO Santa Monica Office. His presence on the West Coast may result in some difficulties in our normal relations with Headquarters in that the regular channels of authority and communication can be circumvented by this direct channel to Long.

UGF: At the end of the third week of the campaign (campaign is one-half over) we received a total pledged amount of $81,720. This appears to be an excellent record, however, in view of having approximately 700 more employees than last year and in addition having received approximately a 6% class act pay increase this record does not look too encouraging. I feel a very significant factor in not achieving a higher pledged amount to date is the reorganization. At the end of the campaign, with proper publicity, we expect to be in a better position toward achieving our goal.

Attachment

MARSHALI SPACE FLIGHT CENTER
FY-1965 C OF F PROGRAM

HUNTSVILLE:

Priority MSFC	Priority OMSF	Project Title	Presented to OMSF Review Board	OMSF Review Board Action Sept.4-6,1963	Recommended by OMSF Sept. 16,1963	Deleted by Office of Programs 10-2-63
1	5	Expansion of Computation Facilities	2,422,500	2,422,500	2,417,000	* 2,417,000
2	6	Extension of Propulsion & Vehicle Engineering Laboratory	2,316,400	2,316,400	2,307,200	* 2,307,200
3	7	Sound Suppressor for S-1C Static Test Stand	6,848,000	6,848,000	6,848,000	
4	9	Special Fluid Mechanics Laboratory	3,595,900	3,595,900	3,690,800	* 3,690,800
5	13	Vehicle Structural Technology Lab.	2,250,000	2,250,000	2,196,000	2,196,000
6	15	Lab. for Explosive Manufacturing Tech.	1,000,000	1,000,000	976,600	976,600
7	12	Non-Destructive Testing Laboratory	566,700	566,700	564,200	564,200
8	8	Extension to Utility Systems	4,000,000	4,000,000	3,910,000	2,010,000
9	14	Heat Treat and Press Laboratory	1,200,000	1,200,000	1,161,000	1,161,000
10	4	Cold Flow Test Facility	2,500,000	2,500,000	2,500,000	
11	1	Additions to Sat. V G.S.E.Test Fac.	2,897,000	2,897,000	2,630,000	
12	2	Expansion of Components Test Fac.	1,900,000	1,900,000	1,900,000	
13	3	Saturn Support Test Area	3,354,000	3,354,000	3,354,000	
14	10	Addition to Instrument Laboratory	2,075,000	2,075,000	2,008,000	2,008,000
15	11	Space Vehicle Research Laboratory	1,088,400	1,088,400	1,088,400	1,088,400
16	-	Component and Model Test Facility	12,500,000	0	0	
		Total	50,513,900	38,013,900	37,551,200	18,419,200

NOTES:

1. OMSF priorities 1 through 7 were classified by the Board as Saturn Program Support Items.
2. Priorities 9 through 15 were classified as Technical Support or Institutional Projects thereby having lower priority in the Lunar Program and less chance for approval.
3. Priority No. 8 supports both categories.

* Proposed for reclama by OMSF. Done! B

October 14 1963

NOTES 10/14/63 BELEW B 10/16

M-1 Program

The M-1 program is currently being planned on a $24.0 M R&D and a $10.0 M facilities budget for FY-64. With considerable reduction in scope and adequate funding in subsequent years ($50 M in FY-65 for R&D) the net effect is a 12 month stretch out resulting in a new PFRT completion in April 1968 and an estimated $8.0 M increase in the total R&D cost. However, more severe cuts appear in the making for FY-65, (as low as $15.0M).

H-1 Program

The most significant impact of deleting requirements for H-1 engines for operational SATURN I vehicles is the cutting of production at the Neosho manufacturing facility. The manpower reduction is forecast to be about 25% of the effective H-1 work force or about 10% of the total work force (Air Force and NASA).

RL10 Program

Information from our contact with LeRC CENTAUR Project people indicates that the first CENTAUR Operational Flight (Surveyor) has slipped 5 months (Spring 65). AC-2, the second Atlas/CENTAUR vehicle, is on the pad but a gear wear problem has developed in the boost pumps. We have obtained from CENTAUR management at LeRC a sign-off of a new engine delivery schedule and funding assuming curtailment of SA-111 and subs. The major impact on P&WA will be in area of decreasing production manpower by about 25%.

F-1 Program

Four tests of the divergent ring injector (a baffle design without decoupling or Delta-P and propellant velocities) in a solid wall chamber have been bombed into instability with 13.5 grain bombs. Recovery was obtained within 15 milliseconds in all tests. An additional test was bombed in sequence with two 13.5 and one 200 grain bombs. Instability was induced with each bomb detonation with recovery in 8, 6, and 12 milliseconds respectively. The test was terminated by program timer. This was the first injector test to be bombed in sequence; the recovery ability is encouraging. F-1 engine F-1001, the first engine to be delivered to MSFC for ground testing, has begun acceptance testing. The engine was gimbaled 4 cycles of a 4 degree circular pattern during an 18 second test. Performance appeared satisfactory. Acceptance testing is continuing with delivery to MSFC expected in early November.

J-2 Program

A presentation is planned at MSFC on results of fuel pump NPSH evaluation and on possible methods of further reducing the NPSH relative to stage weight reduction. Both positions of test stand Delta 2 (500 second capability) have engines installed and preparation for activation is proceeding. The first 500 sec engine test is scheduled for early December.

Harry S- Please look into this & make suggestions. B

General

The contract staff at OMSF (not Brackett's shop) appears to be our final authority on such things as contract scopes of work rather than acting in a capacity as OMSF expeditor and consultant for our contracts at NASA Hq. The latest example is the H-1 contract submitted by MSFC for approval several weeks ago which is held up due to requests by contracts office proposing several scope changes that both we at MSFC and Charles King's office at OMSF feel should not be changed.

NOTES 10/14/63 CONSTAN

1. S-I PROCUREMENT

Chrysler has been advised that in addition to withholding procurement of flight hardware for stages S-1-111 through S-1-116, that no purchases shall be made for equipment and special tooling unless required for S-1-8, S-1-10 and S-1B stages. Furthermore, no purchase orders are to be placed for the third checkout stage.

2. S-I/IB QUARTERLY REVIEW

The next Chrysler S-I/IB Quarterly Review is tentatively scheduled for November 19 and 20 in New Orleans, Louisiana.

3. S-IC QUARTERLY REVIEW

The S-IC Quarterly Review for the 1st quarter of FY 1964 was held at Marshall on October 9 and 10. Following this, conferences are being conducted in regard to funding the Boeing contract according to its contract parts and instituting the reporting procedure in accordance with this funding.

4. COMPUTER OPERATIONS

A high speed data transmission system linking the computer operations office with the Baronne Building in New Orleans, went into operation this week. This allows stage contractor personnel located in the downtown area faster data communication with the computer facility.

NOTES 10-14-63 DANNENBERG

1. Agenda has been reviewed and approved for the regular Monthly G.E. Contract Review meeting scheduled for 10-15-63. Since this meeting coincides with the first anniversary of the GE-MSFC effort, the annual report will be presented. The General Manager of GE Apollo Support Department also plans to attend. ✓

2. The MTO group has arranged for some of the corporate officials of GE to tour MSFC on 10-16-63. The limit of our participation is to describe the relationship of MSFC and GE/Huntsville. ✓

3. The final draft of the scope of work of the next GE contract year has been received, and comments have been forwarded to OMSF this date. ✓

4. MORL Study - At OMSF request, updating of MSFC launch vehicle and propulsion data was extended for 10-16-63 delivery. Very favorable performance and guidance information is being generated for the MSFC report.

KD

Whatever that is

B

NOTES 10-14-63 FORTUNE

1. Visit of Colonel Rip Young: Colonel Rip Young, Executive Assistant to Mr. Webb, visited MTO Tuesday, October 8. A Mason-Rust car drove him to Slidell Computer Center where B. U. Jones of our office and Mayor Williams of Picayune met him. They gave him a quick tour of Picayune. Then B. U. Jones drove him down to our Information Center. Colonels Raymond, Roberts and Palmer plus John Hilburn joined him and briefed him on MTO progress, then showed him around. Colonel Young reported he was quite impressed with construction development at Gainesville, which he had visited over a year before. He also expressed to the newspaper serious concern with the deep cut in NASA appropriations just announced in Washington.

2. Final Inspection of Perimeter Fence: On Wednesday, October 9, final inspection on perimeter fence construction was made by representatives from MTF Working Group, MTO, the Area Engineer Office and the contractor. The only deficiency noted was one post missing. Upon certification by Dusty Rhodes that the specifications have been met, MTO took up property account ability.

3. MTF Working Group Personnel Moving to MTO: Colonel Palmer indicated he would have a total of 8 people moving down here beginning in the near future, and expressed desire that they be housed in the red building which we are just now renovating directly across the field in the front of our Headquarters Building. Boeing and North American have requested authorization to have one representative each at MTO to keep track of construction of their facilities, learning the test structures from the ground up. This has been approved by the Stage Managers from the Saturn V Project Office. They will be housed in the same building.

4. My Visit to North American Monday, Tuesday and Wednesday of this past week: I visited the Space and Information Division and Rocketdyne. I was briefed on their programs, test plans and facilities, then toured Downey Plant, Seal Beach, Canoga Park, Santa Susana and the Edwards Test Site. Construction was not exactly on schedule, their Battle Ship and all system test vehicles also being some 8 to 10 weeks behind Plan V; however, Dr. Mueller was reported to have told Mr. Storms to work up a so-called Schedule III incorporating more or less similar dates to MSFC target schedules. Terminations at Pratt & Whitney and Douglas were reported by Mr. Storms plus certain adjustments in the F-I Engine schedule. I witnessed firing of a J-2 (principally start and stop because of a faulty high temperature indication from a thermocouple), a 200K-rated H-1 and an F-1 combustion chamber test. I learned quite a bit more about comparisons of their S-II Test Stand designs with ours. I also discussed with Don Bowden, Saturn Resident Representative, and later with Bob Kamm and other people from his Western Operations Office, details on inspection, quality assurance and reliability, which will be conducted there, requiring close dove-tailing with similar operations at MTO.

FW 10/14

NOTES 10/14/63 GEISSLER B 10/16

1. Far-field Sound Prediction for Static Test: An automatic data processing system for use in evaluation of our wind and temperature profile measurements is being installed for Aero and Test Laboratory's far-field sound predictions and static test monitorship. This will be the first operational system of its type known to exist. Static test and horn sound intensity level measurements have been compared with an analytical model developed by Aero-Astrodynamics Laboratory. This model employs wind and temperature profiles as input data. Sound intensity levels in the far-field have been derived and agree with the measured sound intensity levels with a standard error of 7 db. The agreement between theory and empirical measurements is encouraging. The system will be of value in future Saturn booster static test sound level predictions. Members of Aero-Astrodynamics Laboratory plan a briefing for Mr. Heimburg after all the analyses are completed. ✓

2. Dynamics and Control Working Group: The action items of the S-II Dynamics and Control Working Group Meeting held October 9, 1963, with S&ID are attached as enclosure 1. ✓

3. "Guidance and Space Flight Theory" Contracts: The 15th Technical Meeting between Contractors and our Astrodynamics and Guidance Theory Division on 9 and 10 October was highlighted by the presentation of two new methods of space flight technology. The first of these concerns a method of simultaneous optimization of flight phases between earth and moon, with due consideration of the constraints. The second paper deals with the direct and explicit numerical generation of guidance functions, intended to replace the statistical method used up to now. The agenda of the meeting is enclosed as enclosure 2. ✓

NOTES 10-14-63 GRAU

1. S-I-6 POST-STATIC CHECKOUT: Simulated Flight Test on S-I-6 was performed with satisfactory results. The vehicle is now undergoing Electromagnetic Compatibility Testing.

2. S-IU-6 FINAL CHECKOUT: Final checkout continues with satisfactory results.

3. S-I-9 PRE-STATIC CHECKOUT: Pre-Static Checkout preparations were completed satisfactorily and the vehicle is now undergoing Pressure and Functional tests in building 4705 pressure cell.

4. PROCUREMENT RELIABILITY REQUIREMENTS: The document NPC 250-1, "Reliability Program Provisions for Space System Contractors", has recently been released by NASA Headquarters for use by the various NASA Centers. Its use is made mandatory by the NASA Circular 293 which defines the responsibilities of the various organizational segments, the extent of application in present and future contracts, and the areas which require particular attention by the originator of a procurement action. Copies of these documents are being distributed all over MSFC. With these documents, the reliability area is covered in a similar way as the quality area with the documents NPC 200-2 and NPC 200-3.

5. DAC RELIABILITY PROGRAM: A draft of the scope of work for the reliability effort on S-IVB has been furnished to DAC for study and preliminary interpretation in order to assure that DAC has a complete understanding of the MSFC requirements, and has an opportunity to explore any areas of uncertainty before detail work and cost determination begins. Representatives of the Reliability Assurance Division are at DAC starting today in order to work with DAC on the layout of the reliability program. As soon as understanding has been reached as to what MSFC requires and what it does not require, the scope of work will be submitted as a contract change.

6. DIGITAL EVENT EVALUATOR (DEE): A Digital Event Evaluator has been placed in use for vehicle checkout in this Laboratory. It replaces the lengthy, cumbersome process of strip chart analysis. The DEE can scan and evaluate the status of up to 768 bi-level input lines, producing the results on typewriter printout or paper tape. It can be used for on-line analysis as well as post-test analysis and record running time and operation cycles on critical items. On-line analysis, running time and cycles were not previously available.

NOTES 10-14-63 GRUENE

1. SA-5 Schedule:

a. The S-IV-5 was mated to the S-I-5 on October 11 according to schedule. We are continuing to run into problems in attempting to eliminate discrepancies found in the DAC hardware. A way will have to be found to improve relations between LVO, IO, and DAC. We will try to work something out with Col. James in the near future.

b. A possible problem area mentioned before has not been completely resolved. Samples of hydraulic oil taken from one of the S-IV-5 engines had an excessive particle count. This was corrected by the circulation of the oil through filters. The oil sample was sent to Dr. Lucas and we are awaiting a decision as to whether samples from the other engines will be required.

c. A new Daily Work Schedule has been published.

2. SA-5 Calibration Summary:

S-I Stage

Total number of measurements on stage	661
Total number of measurement calibrations completed	468
Number of measurements that needed adjusting to meet required tolerance	248

I. U.

Total number of measurements on IU	189
Total number of measurement calibrations completed	111

3. Fuel Injector Purge System: A potential problem was discovered in the Fuel Injector Purge System. It appears the pressure decay after cutoff could cause rough combustion in the event of a cutoff on the pad. We are pursuing a modification with P&VE to correct this problem.

4. Merritt Island Causeway: The new toll causeway from Cocoa to Cape Canaveral Harbor was finally opened on October 10.

NOTES 10/14/63 HAEUSSERMANN

1. COMPUTER DISPLAY SYSTEM: The Electrical Working Group meeting was held during the week of October 7, during which the working group members had an opportunity to see three different computer displays in operation. These were: (1) Douglas; (2) Electrada Corporation, who is under contract to NAA to furnish the S-II stage checkout display system; and (3) RCA, who is furnishing the initial display system to operate with the RCA-110 computer. Investigations are continuing in an effort to select the best available display system to integrate with our automatic checkout system.

2. APOLLO GUIDANCE & NAVIGATION REVIEW IN HOUSTON (October 9, 1963:) Although the computer to be used in the Command Module and in the LEM was only one of the items discussed in this meeting, it came up repeatedly all day long. Bellcomm personnel described the Saturn computer and proposed it to be used in the Command Module and in the LEM. MIT proposes that two of their computers be used for the mission with one on standby. Almost everyone questioned how this approach would actually be accomplished and how it could avoid failures during critical portions of the mission. MIT stated that they felt the Saturn computer could do the Saturn job but that it could not be used for the Apollo task. Bellcomm says this is not correct and is presently evaluating the MIT statements made concerning program ability of the machine.

MSFC personnel acted purely as observers and did not comment during the meeting. Afterwards, Dr. Shea met with Dr. W. Haeussermann, F. B. Moore, and L. G. Richard and asked that we continue to support this effort even though he felt he could not direct that this machine be used in Apollo until he had been in his new job for a while.

ITEM 2 LIMITED DISTRIBUTION FOR DR. VON BRAUN ONLY

NOTES 10/14/63 HEIMBURG

1. S-I-7: A full-duration static firing of S-I-7 is scheduled for Tuesday, 10/22. The engine (position 2) with the leaking thrust chamber has been replaced, and the remaining engines have been re-orificed to provide thrust within the specified range.

2. Liquid Hydrogen Stratification Tests: The test program was conducted satisfactorily on Saturday and Sunday, 10/12 and 10/13. The data are being reduced and evaluated, and the test setup will be dismantled and the S-IV tankage returned to AMR if the data indicate satisfactory results.

3. F-1 Engine (Static Test Tower West): The first MSFC engine (No. 1001) has completed firings for 16, 20, 40, and 116 seconds at EAFB. This engine has been returned to Canoga Park for checkout and subsequent shipment to MSFC.

Difficulty has been experienced in the component buildup for this facility. The lox inlet duct (PVC joint), being manufactured by the Arrowhead Company for installation at MSFC, failed under hydrostatic pressure test at 128 psi. Working pressure for this part is 180 psi, and test pressure is 235 psi. P&VE (Mr. Furman) has made arrangements for the manufacture of a stronger duct, utilizing S-IC-T components, for use with the F-1 engine tests at MSFC. This situation reflects the status of S-IC component development, which is not encouraging at this time.

4. Swing Arms (LC-34): (Reference is made to Item 3, NOTES 10/7/63 HEIMBURG: Acceptance testing of the LC-34 umbilical swing arms was completed on 9/24/63. The GH_2 vent coupling on arm 3 has not proven to be reliable in that the secondary release system will not disconnect the coupling, should the arm hydraulic system fail and icing conditions exist. Recommendations have again been made to LOC for a redesign of the coupling.) Additional testing of S-IV stage GH_2 vent coupling on arm 3 is scheduled to begin on 10/15. This is in accordance with an agreement with LOC to perform field modifications in order to use the present coupling design for SA-5 & 6. Redesign of this coupling will be performed, if deemed necessary, for SA-7 and subsequent, based on the results of these tests.

5. S-IC Holddown Arm Test Stand: A test stand (located NW of building 4350) has been completed to test, individually, each of the four S-IC holddown arms, prior to their installation in the Saturn V Static Test Stand. The first holddown arm is presently being installed in the stand, and initial testing is scheduled to start in November. A pressurized pentadome will be used to permit testing during inclement weather. A conceptual picture of this test facility is attached for your information.

6. MTF Working Group: MSFC was informed by TWX on 10/10 that the procurement plan for the MTF Phases II & III Technical Systems will be returned for revision. This decision was the result of several coordination review meetings, in which MSFC was not invited to participate. We have been advised informally that a major reason for the rejection of our original plan is insufficient documentation justifying noncompetitive procurement. Informal notification of a coordination review meeting to be held in OMSF on Thursday, 10/17, has been received.

Full agreement was reached last week with White Sands Proving Ground (WSPG) for the transfer of 4 diesel electric generators (with combined capacity of 6,000 kva) from WSPG to MTF for use as emergency generators.

A supplemental submittal is being prepared for adaptation of the F-1 engine stand at MTF for use in S-IB stage testing & possible S-II & other stage or engine testing.

ATTACHMENT: Photograph of S-IC Holddown Arm Test Stand

Fw 10/14

B 10/16

NOTES 10-14-63 HOELZER

No report.

B 10/16

NOTES 10-15-63 JAMES

SATURN I/IB "FLAPS:" This Office is currently involved in three major exercises for NASA Headquarters: (1) A detailed discussion of the FY '64-'65 budget with OMSF staff and Dr. Seaman's staff took place all last week. (2) The study on curtailment of SATURN I operational program and rephasing of SATURN IB was interrupted by the above budget exercise. Effort on this study resumed on 10-11-63 working toward a dry run to M-DIR on 10-17-63. (3) The OMSF Schedule submission (SARP Charts) and Program Review exercise started last week working toward the presentation to the Management Council on 10-29-63. ✓

SATURN I - SA-5 - S-IU: Vibration testing of S-IU-5 configuration at Wyle Labs is continuing using the tierod fix. A problem exists which is basically to shift the resonant frequency of the center hub away from a resonant frequency of the platform. P&VE is evaluating the problem, and it appears in the design of the tierods that the tierod natural frequency was not considered. A redesign and production of these tierods is underway. The hardware will be installed and tested early this week. The decision will be made after testing and may result in the installation of the newly designed tierods in S-IU-5. This would have no effect on planned launch of SA-5. ✓

*JW S-IV-5: S-IV-5 Stage accomplishment of final work packages has proceeded at a rate paced by the slow delivery of critical parts. Four work packages have been rescheduled for accomplishment after mating with the S-I stage. An unscheduled inspection of the flight sequencer has revealed electronic assembly techniques which have created a condition that makes the rework of a significant number of soldered connections mandatory. The flight sequencer of the S-IV-6 vehicle has been air-shipped to AMR in an effort to avert a schedule impact. Stage mating was completed on 10-11-63. ✓

*JW S-IVB MANUFACTURING: (1) The common bulkhead for the hydrostatic test stage has been seal welded between the attach angles and leak testing has been completed. (2) The forward common dome for the dynamics stage is now complete. Layup of the common bulkhead should begin this week. (3) Four segments have now been welded on the aft LOX dome for the dynamics stage. DAC is experiencing difficulty with the welding equipment in the Meridian Welder. New welding equipment may be required. (4) Installation of the turntable tailstock is scheduled later this week at the Huntington Beach Assembly Tower Complex. Preliminary alignment of the assembly tower supports was made on 10-9-63. ✓

NOTES 10-14-63 Koelle

1. FUTURE PROJECTS WEEK: This week we will present the results of three years' study effort to the MSFC engineering staff. We have lined up 23 condensed papers on future projects. The purpose of the exercise is to assure good communications between our project office and the line organizations. The engineering personnel are invited on the basis of their interest and whether their supervisors can spare them. They can select the papers they wish to hear, on an individual basis. The total symposium will take 2-1/2 days. You approved this idea a few months ago when I suggested it in the NOTES. A few Headquarters representatives will also attend to get a better understanding of what we are trying to do.

2. NEW ENGINE DEVELOPMENTS: We are trying to get an official discussion underway on why and when a new engine development should start, and in which way we would like to see the M-1 engine go. We had a large systems meeting on this subject a few weeks ago, attended by all major airframe and engine contractors. (The minutes of this meeting have been sent to you at your request.) The next step is the development of a MSFC position paper. We have discussed this with P&VE. We are timing our action in such a way that a firm recommendation can be made when the discussions start for FY 1966 (March 1964). Do you have any guidance to offer at this time? No. Maybe after we know more about FY 64 funds

3. GLOBAL TRANSPORT: I have discovered a quote of Dr. Lloyd Berkner (for many years President of the Space Science Board of the National Academy of Science), which I consider to be important and interesting:

[From Hearings before the Committee on Aeronautical and Space Sciences, United States Senate, June 10 and 11, 1963.]

"The future use of rockets for quick point-to-point transport now is as certain as we now know scheduled 600-m.p.h. air transport had become after the demonstration at Kitty Hawk. Without question, technological problems of regular rocket transport are enormous. But there is no known natural or scientific dictum that stands in the way of such transport on an efficient and regular basis. So, we can confidently predict that fast rocket transport will come, eventually, to give us 20-minute transatlantic schedules."

FW 10/14

B 10/16

NOTES 10-14-63 KUERS

*FW 1. Saturn V, S-IC Stage: a. The assembly of the Fuel Aft Adapter, i.e. the support structure for the Fuel Test Container for structural load tests, has been started. No problem is foreseen in completing this structure in time. Also the sub-assembly for the Center Engine Support (Cross Beams) for S-IC-T has been started. b. A delay of one week in welding the dome to the cylindrical section for the lower fuel bulkhead has occurred because of a breakdown of the welding equipment. Our people and Sciaky engineers were not yet able to find the cause for the malfunction. Over the week end of 10/7 we moved a complete set of substitute equipment to the meridian welding station and started welding last Sunday morning at 3:30 A.M. This weld was successfully completed over the week end 10/13/63. ✓

2. Rift Manufacturing Engineering Working Group Meeting: Last week we held the third 2-day Manufacturing Engineering Working Group meeting with Lockheed on the Rift Program here at Huntsville. Besides many supervisory manufacturing engineering personnel from LMSC, Mr. G. Putt, Vice President and General Manager of LMSC, Dr. Plank, Project Manager, and Mr. Milt Steen, Development Manufacturing Manager participated in the meeting. Also two representatives from Grumman Aircraft Company attended the sessions. A review and summary of results of various Splinter Group meetings was made and the following topics were discussed: Progress of Rift Manufacturing Plan; Experimental Tooling Program; Current Manufacturing Development Work; and Progress of Propellant Tank Facility (Moffet Hangar). One topic of specific interest was a discussion of the best method of forming bulkhead gore segments. Since the capacity of presently available stretchform presses is insufficient to form these large components the Saturn V stage contractors had to resort to explosive forming and hydraulic bulge forming methods. The Sheridan-Gray Company has now completed the design of a 6,000 ton stretch press (present tonage of biggest press is 1,000 tons) with all the features required in the arrangement and actuation of clamping jaws to accommodate plate sizes as needed for the S-IC, S-II and Rift program. The approximate price is 1.250 million dollars, delivery time is 24 months. The question arises whether it would be advantageous to order one machine of this type to support all stages in the forming of gore segments. The same proposal to buy this machine has been made by DAC--also for support of all Saturn V stages. We are presently engaged in a thorough study to determine the merits and disadvantages of all known forming methods for gore segments. This study takes into account all the experience gained so far and also all the special design features and requirements of the different stages. The fiscal report will become available beginning of December. The manufacturing technique development and also manufacturing equipment development has not yet caught up with the requirements for large space vehicles. One might also call this a fabricability barrier. ✓

NOTES 10-14-63 MAUS B 10/16

1. SCHEDULING & REVIEW PROCEDURE - OCTOBER REVIEW - OMSF has requested a complete submission of all charts in accordance with the new scheduling manual procedures on October 28, 1963. An internal MSFC Director's Review is scheduled for 1-5 p.m., October 23. The OMSF Program Review will be held in conjunction with the Management Council meeting on October 29, 1963. MSFC Project Managers will make the MSFC presentations; and a Level 1 or Program Summary presentation is to be made by OMSF. ✓

2. APPRAISAL OF MSFC NEED FOR CENTRAL ADP AUTHORITY - In view of the many recent pressures exerted by Congress, General Accounting Office, Bureau of the Budget, and NASA headquarters for improved management in the ADP acquisition and utilization procedures, we have initiated a study of the need for a central ADP authority and control point within MSFC. ✓

3. MANPOWER PLANNING

a. CIVIL SERVICE CEILING - NASA presently is authorized a 30,300 personnel ceiling. The House Committee action to cut NASA to its end of FY 63 ceiling of 28,547 would result in a cut of about 1,750 people. Attrition could bring the total down to the required ceiling if a freeze were placed on all centers. If the manned centers were excluded from the attrition reduction, a RIF would be necessary elsewhere in NASA. Wyatt's Office of Programs is proposing three plans to top NASA management:

(1) A distribution of 28,547 in which MSFC actually loses spaces.
(2) A distribution of the present 30,300 in which we gain a few spaces.
(3) A distribution of the budgeted 33,100 where MSFC increases significantly.

A TWX was received Friday, confirming our ceiling of 7242 until the matter is resolved. ✓

b. UNFILLED SPACES - As of October 4, MSFC had 83 permanent unfilled spaces. Of these, 45 are committed, and 25 are occupied by temporary employees. ✓

Fw 10/14

NOTES 10-14-63 MRAZEK B 10/16

1. RIFT: A comparative evaluation, by this laboratory, of Lockheed Thrust Vector Trim and the Aerojet-General Thrust Vector Control systems has been completed. The two proposed systems were investigated as to their suitability for controlling the RIFT and S-N stages. The results of the evaluation indicated that neither system, as presently defined, possesses sufficient technical or mechanical advantages to warrant its adoption over the other.

*Fw 2. NASA/NAVY AGREEMENTS: The final signatures were obtained 10-11-63, and completed the transaction between NASA and the Navy for the use of Hangar No. 1, Moffett Field. MSFC now has the use of this hangar on a ten-year lease.

3. ROVER INTEGRATED SCHEDULE: The long awaited integrated schedule meeting was held with Harry Finger on 10-4-63. The integrated schedule which resulted is essentially the schedule that appears in the revised RIFT Project Development Plan. The major difference is that Mr. Finger agreed to the requirement for facility advanced design funds in FY-65 for the Nuclear Rocket Development Station facilities. Mr. Finger shortened the engine development proposed by the Space Nuclear Propulsion Office - Cleveland by approximately nineteen months to match the MSFC RIFT schedule.

4. DEVELOPMENT OF 200K H-1 ENGINE: We have decided to go ahead with development of a 200K H-1 engine. Testing has started and the engines will be instrumented to provide data on areas which might require attention. ? Fw

5. F-1 DIVERGENT RING INJECTOR: An injector recovered from an instability induced by the detonation of three bombs mounted in different locations during the test. A 200-grain charge was placed in the center and 13.5-grain charges were located on the face and on the divergent ring. This is the first multiple-bomb test on an F-1 injector. The injector has consecutively damped five times in the five valid bomb tests.

6. SATURN V: This laboratory proposes to utilize the S-IC-D (heavy thrust structure) for a Phase I dynamic test program at MSFC. This stage will be sent to Launch Operations Center as a checkout stage when the S-IC-F (lightweight thrust structure) has been delivered to MSFC for the Phase II dynamic test program. S-IC-D and SA-501 will have heavy thrust structures and lightweight tanks. S-IC-F and SA-502 will have lightweight thrust structures and tanks.

WM! Suggest to use different words in official communications. We cannot, all by ourselves, "decide to go ahead with the development of a new engine". But we can "raise the red line of an existing one thru minor modifications" (Let's not ask for trouble). B 10/16

NOTES 10/14/63 RUDOLPH

1. S-IC STAGE: The Saturn V/S-IC Quarterly Tech Progress Review was held at MSFC on October 9, 1963.
A meeting was held Oct 4, with the Boeing Company on revisions to D5-11229, the document which describes the configuration of the S-IC Test & Checkout Station. A divergence of opinion exists on the amount of detail this document should contain. Further discussions are being held with the Boeing Company in an attempt to reach an agreement by Oct 18.
As a result of IBEW strike at Michoud, facility completion dates slipped 1-9 weeks (Component Test & Qual Assurance hardest hit) and there is approximately a 4 week delay (Plan V) in production of Y rings, bulkheads and LOX tunnels.

Structural redesigns to recover the 10,449 lbs. of weight added to the Propulsion Sys (Rocketdyne) are in process. They consist of thrust structure modifications and possible use of titanium and/or other high strength to weight materials.

Fifth S-IC/F-1 Interface Meeting: Direction from MSFC is being coordinated to provide firm design information for resolution of interface between Boeing and Rocketdyne.

S-IC-T: Gore segment outlet hole rout and fittings welding continues. Vendors capable of supplying aluminum and stainless steel tubing to stringent MSFC standards are currently being sought. The high grade tubing is required to support the close tolerances for MC fittings specifications. Previous AN and MS tube connection standards have been source of leaks; the fix of which has been the use of crush washers.

2. S-II STAGE: NAA has requested MSFC concurrence to utilize eight tenths inch insulation thickness for the LH_2 tanks on the first three vehicles, stating the anticipated payload penalty in earth orbit would be approximately 3,600 lbs. based on a higher heat input.

3. S-IVB STAGE: The common bulkhead for the hydrostatic test stage has been seal welded between the attach angles and leak testing has been completed. The forward common dome for the dynamics stage is now complete. Layup of the common bulkhead should begin this week.
Four segments have now been welded on the aft LOX dome for the dynamics stage. DAC is experiencing difficulty with the welding equipment in the Meridian Welder. New welding equipment may be required.

Battleship Stage: S-IVB resident personnel conducted a review of the battleship program with the contractor on 10-8-63. Indications are that the estimated fabrication completion dates for stage and GSE hardware are close to schedule.

4. Instrument Unit: The procurement plans for the IBM IU Systems Integration effort, Guid Comp development, and Data Adapter development have been approved by the NASA Administrator, and will be returned to MSFC Oct 10, 63. An urgent requirement exists to implement contractual action immediately in that IBM has expended approximately 1M dollars of corporate funds. It appears that problems will arise in supplying a complete IU for the Astrionics Saturn V Breadboard within the time requested. Delay of documentation defining long lead items will probably cause a slippage of 2 months

NOTES - 10-14-63-SHEPHERD

FY-64 CofF: The House Appropriation Bill ($5.1 Billion) reduced the total CofF to NASA by $33 M. It is anticipated by OMSF that their cut will be approximately $25 M, of this amount Marshall can expect some cut. Our first position is that we are extremely short of funds in FY-64, therefore, a reduction will be opposed. We are preparing a priority listing of projects for internal use by Marshall in case our first position does not hold and it is necessary for Marshall to take a cut.

F-I Facilities at Edwards Air Force Base: All work is going well and on schedule. A November 15 BOD for pre-Test Building 1-D looks firm. On Test Stand 1-D, installation of wiring, propellant piping, firex and deflector water piping is in progress. On Test Stand 1-C, all steel erection and installation of run tanks will be completed by October 14. Instrumentation being installed in the Control Center. A 3,000,000 gallon water tank is scheduled to receive water on October 22. Discussions in progress on means to reduce the cost of environmental requirements for F-I testing on Test Stand 1-E; e.g., requirement for temperature conditioning of the entire F-1 Engine plus 65,000 gallons of RP-1.

S-II Facilities, Seal Beach: Construction contractor is cleaning up punch list items on the Bulkhead Fabrication and Service Buildings and Site Preparation. Construction schedule for the Vertical Assembly Building is showing slight improvement. However, BOD for stations 1 (welding) and 6 (hydrostatic test) of November 22 and December 20 respectively, do not appear to be achievable. The current schedule provides BOD for these two stations in mid-March. A substantial premium (on the order of $300,000) could improve the schedule to early January but needs more evaluation and careful comparison with project needs.

Santa Susana: Total job is 75% complete and proceeding well. The only known impending change of any substance involves additions to the digital data instrumentation system.

MTF: Bid opening for S-II Test Stand has been postponed to October 24 due to addenda issued during the bidding period.

S-IVB Facilities at Sacramento: Construction contract for Gamma Complex awarded on October 12. Construction progress on Beta Complex is normal and satisfactory.

Land Costs at MTF: Information has been received from the Mobile District that an additional $3,075,000 will be required to complete the transactions for real estate in the fee and buffer zones. Stated reasons for overrun are: (1) low estimate for the cost of improvements by the original appraisers, and (2) decision to purchase rather than obtain easements on land owned by local electrical cooperative in the buffer zone. The additional money is needed by March 1, and is very likely to have to come from MSFC local resources.

fw 10/14

B 10/16

NOTES 10-14-63 Stuhlinger

1. FY-64 OMSF R&T PROGRAM: As a result of our meeting with representatives from OMSF and OART on the subject of funding support for tank structure tasks (see Attachment #1), we received approval for an additional 4.661 million dollars covering all of the additional tasks we had asked for. We have not yet received program authority, but expect to receive it in the near future. This makes a total of 9.675 million dollars approved out of a total guideline of 13.2 million dollars. We are continuing our efforts in trying to "shake loose" the remaining program approval.

2. FY-64 OSS RESEARCH PROGRAM: The Office of Space Science, Lunar and Planetary Programs, has informed us that we can only expect 400 thousand dollars in FY-64 and only for the Sterilization Program.

3. METEOROID PROJECT: A review meeting with representatives from MSFC, LaRC, and the contractors has been called by Headquarters for October 14. It is expected that the development and testing schedule for the MMC will be revised slightly.

Attachment #1 - NOTES 10-7-63 Stuhlinger

October 28, 1963

NOTES 10-28-63 BELEW

F-1 ENGINE PROGRAM

The Fifth F-1/S-IC Interface Meeting was held recently in New Orleans, with MSFC, Rocketdyne and Boeing participating. The most significant conclusion was the resolution, pending confirmation by environmental data, of the vibration loads imposed on the F-1 turbopump by the vehicle suction line/turbopump coupling. Previous analysis had indicated that these loads would exceed the allowable flange loads by a factor of three. The most recent calculations and tests, however, indicated that the original assumptions and analyses were far too conservative, and no redesign is now contemplated.

H-1 ENGINE PROGRAM

A firm Center position to uprate the H-1 engine to 200K must be established by November 1, 1963, if Saturn IB, S-I-204 effectivity is required. Aero-Astrodynamics Laboratory and P&VE Laboratory have informed this office of a payload deficiency of several hundred pounds in the Saturn IB. They anticipate that uprating of the H-1 engine will be required.

J-2 ENGINE PROGRAM

The LH_2 turbopump completed a successful 660-second run at full power in Components Test Laboratory V.

A representative of Test Laboratory will participate in the activation of Test Stand Delta-2B (500-second run capability) the week of October 28, 1963.

RL10 ENGINE PROGRAM

Engine tests are being run at Florida to see if contamination found in S-IV-5 engines will permit normal operation. The contaminated LH_2 valves are being replaced. Tank pressurization valves on the S-IV-5 engines were damaged during inadvertent pressurization. They are also being replaced.

A component test stand doing hypergolic ignition work was damaged and several individuals injured Thursday, when a fire developed on the stand.

Correction to Notes of 10/21/63: The statement "In view of the certain budgetary support, and the imminence of the Centaur and Saturn flights (with the consequent need for a flexible contract) continuation of CPFF contracting appears to be the only practical course. OMSF agrees." should be corrected to read "In view of the uncertain budgetary support".

NOTES 10/28/63 CONSTAN

B 10/29

1. UNITED GIVERS FUND

The United Fund for the Greater New Orleans Area ended October 25, 1963 at Michoud Operations. The United Fund for the New Orleans Area is the equivalent of the Huntsville United Givers Campaign. Michoud Operations had 100% participation with a total dollar amount of $3844.50. This represents a per capita donationof $15.32 which is considered extremely high for federal employees in this area.

2. BOEING INDEPENDENT RESEARCH AND DEVELOPMENT

Bob Young suggest you take up this suggestion B

Present indications of Boeing overhead allocation in the area of independent research and development and technical overhead when projected over five years the program will increase total expenses in the area from approximately $8M to $16M. Joint NASA/DOD participation in independent research and development negotiation should insure that the Saturn Program will not bear disproportinate share of overhead in this area.

3. MASON-RUST QUARTERLY REVIEW

On October 29, 1963 a Quarterly Review of the Mason-Rust efforts will be conducted at Michoud Operations.

4. GAO REVIEW OF MICHOUD OPERATIONS

The General Accounting office has been reviewing Michoud Operations in two phases, a review of Michoud Computer Complex and an over all review of Michoud Contracts.

a. Computer Operations

This review began July 15, 1963 and the exit conference is scheduled for October 31, 1963 informal contact with GAO indicates two points will be discussed consisting of (1) the lease versus purchase of equipment and (2) recoupment of payments on the Honeywell equipment resulting from non-use of all allowable test time.

b. Michoud Contracts

The entrance conference on the review of Michoud contracts was held August 26, 1963. The scope of this review is stated as a review of both the contracts at Michoud as well as operations of the contractors under these contracts. Presently there are four auditors assigned and an additional four auditors will be assigned by November 15, 1963. The review is anticipated to take from nine months to a year. The auditors have been reviewing the contract and negotiation files and it is anticipated that they will begin going into contractor's organizations in the near future.

NOTES 10-28-63 DANNENBERG

1. The second Panel Review Board meeting, scheduled for 11-7-63 in Washington, will be chaired by Dr. Mueller.

2. MSC re-evaluation of flight missions considering SAT I unmanned flights has tentatively resulted in a plan to fly 3 unmanned missions and 6 manned missions on SAT IB. The manned missions considered are 3 CM, SM flights (no LEM), and 3 CM, SM, + LEM flights.

3. Re NOTES 10-7-63 DANNENBERG, item 1 (Attachment 1) - A meeting was held in Washington on 10-25-63, between NASA and GE personnel to discuss the new GE work statement. The only question concerning the MSFC portion of the work statement was in reference to the method of processing the fabrication effort into the contract. The work statement as written contains no fabrication work; therefore, the capabilities of the 40 man shop are not being fully utilized. Mr. Keuch, HQ's, stated that all fabrication work would be entered into the work statement by the issuance of task orders under par. 2.3. Mr. Records, GE, indicated that this process was too lengthy for the quick response required by the model shop at Huntsville. Mr. Keuch stated that he was aware of this situation and was sure that the administrative processing problems would be resolved.
(Note: R-ASTR,on 10-24-63, initiated a request for a task order,and this is now being processed through MSFC channels.)

4. Re NOTES 10-7-63 DANNENBERG, item 2 (Attachment 1) - A new IO/R&DO charter for the Working Groups is being prepared containing several important changes. This charter will be shown to you as soon as it has been coordinated.

NOTES 10/28/63 FORTUNE

1. Shortage of Electric Power for Construction: Hardin Shattuck, President of Coast Electric, reported to me Friday that there would be no additional electric power available for construction as his present sub-station is now completely loaded. Col. Raymond appointed a comittee to look into this and report next Thursday. It looks to me like some C of F funds would be required either for a new sub-station or to provide mobile generated electricity. BF Problem exists for construction period only. Right? B

2. Visit by John Hill, Engine Office, Michoud, and Roscoe Nicholson, Rocketdyne Representative: These two gentlemen visited MTO Friday to discuss arrangements for F-1, J-2 and possibly H-1 Engine field service and support for Michoud and MTO. They feel they can both provide for George Constan's needs and ours, under general technical direction, of course, from Lee Belew. The F-1 Engine spares will be warehoused at Michoud but the J-2 here. Some component disassembly and test will be required, with cryogenic hydrolic and hydrostatic facilities being necessary.

3. Mississippi Educational Capabilities: Tuesday this subject was given thorough review at the annual conference of the Mississippi Association of School Administrators. Mr. Lott, Vice President of Southern Bell, discussed educational television and he was followed by a state panel who covered how they intended to use it to augment current deficiencies and technical subjects dissemination to greater number of pupils, etc. I used certain portions of previous MSFC speeches on education, plus comments of my own on the needs for greater coverage of science and math in grade and high schools, plus the great desirability of higher educational facilities near by MTO in order to attract high caliber engineers. Dr. Colvard, President, Mississippi State University, followed me and backed this up heartedly, saying Mississippi educational capabilities have to be greatly expanded and strengthened. Incidentally, copies of Dr. von Braun's speech to the Rural Electric Association of the four surrounding southern states have been reprinted and distributed to several hundred science classes. Hardin Shattuck reported requests are still coming in for it.

NOTES 10/28/63 GEISSLER

1. Apollo Range Safety: The Trajectory and Flight Safety Sub-Panel of the Launch Operations Coordination Panel met Oct. 22 at LOC. Main purpose was to define problem areas and what additional information the Range Safety Office (RSO) at the Cape needs in evaluating Saturn range safety problems. Meeting results are: (1) MSC will justify to RSO the 72° launch azimuth for all manned flights; (2) MSC does not want destruct system on service module. RSO says destruct system is required. MSC (Mr. Clements) will obtain MSC stand on this item; (3) Overall question of "who computes range safety data and how it will be furnished to Cape" will be decided in Flight Mechanics, Dynamics, Guidance & Control Panel.

2. Aerodynamics Panel: As of Oct. 24, no official reply has been received from MSC concerning our proposed Aerodynamics Panel. LOC replied and nominated Dr. Knothe as their contact. Dr. Kuettner talked with Mr. Maloney of MSC, and unofficially Dr. Kuettner thinks MSC is responsive to our proposal. Presently the Aerodynamics Panel is on the agenda for the Oct. 30 Panel Review Board. However, I doubt that preliminary agreement by MSFC, MSC and LOC can be accomplished prior to Oct. 30, so item will probably be postponed until November P. R. B. meeting.

3. Orbital Debris Study Status: The second Orbital Debris Study meeting was held on October 25 with Lockheed (Huntsville Operations). Contract is 70% complete. Lockheed recommended a retro system for deorbiting the S-IV B stage of Saturn IB and V. The Saturn V data are preliminary and additional studies are required. The remainder of the contract effort will be devoted to pursuing further the design of a retro system for Saturn IB and to examine other deorbiting systems for Saturn IB. Several proposed deorbiting systems for Saturn V will be studied further and recommendations will be made. A stepped up effort in this overall study is necessary. It is hoped that necessary funds can be obtained. Some negotiations with Mr. Vacco's office (Mr. Abernathy) have taken place on the subject. No hardware fabrication is planned. A recent letter from Mr. Low of OMSF to Dr. Gilruth at Houston is attached, and basically is a request to Houston to support an orbital debris study program concerned with orbital vehicles and spacecraft under MSC cognizance. We shall continue to keep you informed of our activities and coordinate with MSC and OMSF as required.

4. Review of Chrysler's Aero-Astrodynamics Contract NAS8-4016: On Oct. 23, the first quarterly technical review (period of July through Sep) of this contract was held. Under this contract, Chrysler has made some progress in establishing an Aeroballistics Section at Michoud, in spite of their problems in obtaining qualified personnel and the fact that they have few people on board from the "old Chrysler team." It will take some time for their team to become completely familiar with our programs and operating techniques, but they are working hard to accomplish this. Chrysler will continue to build up this section, broaden their skills and demonstrate their competence. We hope to be able to assign them Aeroballistics system responsibility by early 1966.

NOTES 10-28-63 GRAU

1. S-I-6/S-IU-6 CHECKOUT: Post-Static checkout of S-I-6 and final checkout of S-IU-6 are essentially complete and preparation for the Mated Test is underway.

2. S-I-9 PRE-STATIC CHECKOUT: Pre-Static mechanical checkout on the S-I-9 stage continues in the pressure cell of building 4705. A portion of the mechanical test will be delayed until after performance testing due to missing hardware.

3. S-IV-6 WORKMANSHIP EVALUATION: An evaluation was made of the electrical workmanship quality of selected S-IV-6 electronic components as a result of inferior workmanship found on the flight sequencer on S-IV-5 at the Cape. The evaluation did not reveal gross quality problems; minor discrepancies were found and corrected. A comprehensive report on this endeavor is being prepared, and re-direction as required will be given to Douglas Aircraft Company and/or the resident Government Inspection Agency.

4. LISTING OF APPROVED QUALITY PROGRAM PLANS: A list of contractors and Government Inspection Agencies that have had their quality program plans approved by the Quality Engineering Division of this Laboratory under the NPC 200 series documents has been prepared for distribution to interested organizations. The list will be maintained and updated as additional information becomes available.

5. CHRYSLER SPACE DIVISION TRAINING: Chrysler Space Division will send nine people to this Laboratory on October 28, 1963, to participate in the weight and alignment test of S-I-9. This is considered CSD's "graduation" exercise in training for that area.

6. TRAINING OF LOCKHEED PERSONNEL: The training program to elevate the proficiency of Lockheed personnel to that required on the RIFT program began with the arrival of a mechanical inspector from Lockheed on October 21, 1963. He is expected to be at MSFC for three weeks.

7. CREW SURVIVAL PRESENTATION: A presentation on the need for apportionment of the probability of crew survival to mission phases and to launch vehicles and spacecraft has been prepared at the request of Dr. Kuettner. This presentation was given to Dr. Kuettner October 22, 1963, and is scheduled for Dr. Rees on October 28, 1963. The presentation will then be given to the Panel Review Board in Washington, D.C., on November 7, 1963.

NOTES 10-28-63 GRUENE

SA-5 Schedule:

1. Hurricane Ginny forced us to interrupt our pad preparations last week which made a new launch target date necessary. Dr. Mueller was immediately informed about this fact. Our new target date is the fifth day after our former date.

2. During propulsion systems test on the S-IV, flakes of a sealant were found below the filtering screens. An investigation was conducted in coordination with P&VE, DAC and Pratt & Whitney. Some additional screens will be provided by DAC for inclusion at a later date. Necessary additional leakage checks will be run concurrently with other operations during this and the following week.

3. During the securing for the hurricane, desiccant plugs were installed on the S-IV engine. During a checkout performed by second shift personnel, this was overlooked and an over pressurization was observed. DAC and LVO investigated and were assured that no damage was done.

4. R-ASTR requested us to check possible hydraulic contamination in the S-IV Control System at a later date. This can be accomplished without influencing the schedule.

5. DAC is still short of telemetry spare parts which might become a problem in case of malfunctions. We are working on that.

FW 10/28

NOTES 10/28/63 HAEUSSERMANN B 10/28

No submission this week.

JW 10/28

B 10/29

NOTES 10/28/63 HEIMBURG

*JW 1. S-I-7: A successful 145-second firing was conducted on Tuesday, 10/22. Testing is now complete on this stage, which will be removed from the stand on Thursday, 10/31.

2. F-1 Testing (Static Test Tower West): Present best estimate for the initial test of Engine 1001 is 11/21/63. This schedule is based on making cold flow tests of the system prior to engine installation. Although this represents an additional step (which was not previously planned), it is considered necessary as a safety measure.

3. Liquid Hydrogen Stratification Tests: A short series of tests will be conducted on 11/5, in accordance with objectives defined by P&VE to verify the results of the last tests (10/12 & 10/13). These additional tests will result in a few days slip in the delivery of the S-IV stage to LOC for complex checkout. SAT-1 System Office has been informed and is determining the impact thereof.

4. S-IV-6: Initial firing is scheduled for Wednesday, 12/4, which represents a schedule slip of one week. This delay is necessary to permit clean-out of insulation material in the LH_2 ducting. A similar problem was encountered on S-IV-5 at LOC.

5. Swing Arms (LC-34): On 10/23 & 10/24, five successful tests were conducted on the ground half of the S-IV GH_2 vent coupling at cryogenic temperatures with icing conditions simulating a complete arm failure. A "fix," in the form of a polyurethane filler behind the sliding sleeve to prevent ice from forming in this area, was incorporated. An "A" frame was also added to the swing arm structure to lower the point at which the static tie-line cable releases the coupling. Testing will continue. Although it appears these "fixes" will prevent malfunction of the coupling, sufficient data are not yet available to insure the infallibility thereof.

6. Incident in Components Test Lab: During a test in the scale model sound suppression test stand on 10/22, an explosion and fire occurred in a lox filter. An RP-1 line was subsequently ruptured providing fuel for a few seconds prior to emergency shutdown. No injuries occurred, and damage was limited to the upper part of the test setup, including the instrumentation cables. Subsequent investigation revealed that the lox system was contaminated with at least two kinds of hydrocarbons, source as yet undetermined. A thorough cleaning of the system has been started with the assistance of the P&VE Chemistry Lab. Testing at this facility will be resumed during the week of 11/12.

*JW 7. MTF Working Group: NASA Headquarters announced selection of both Linde and Air Products and Chemical Company for parallel negotiations for the LH_2 plant. One of the firms will be awarded a contract, on the basis of the negotiations. Bids were opened on 10/24 for the S-II complex. George A. Fuller was the apparent low bidder; however, subsequent evaluation revealed an error in his bid, and Leavell is now the apparent low bidder for both base and option. Bid value is $15,687,000. The high pressure H_2O pumps were re-advertised for bids, and Nordberg is the apparent low bidder. However, Fairbanks-Morse has filed a 53-page protest, which is presently being evaluated by the Office Chief of Engineers. Pump station design is proceeding based on the use of the Nordberg pumps. This action is necessary in order to meet the schedules for the first S-II test stand.

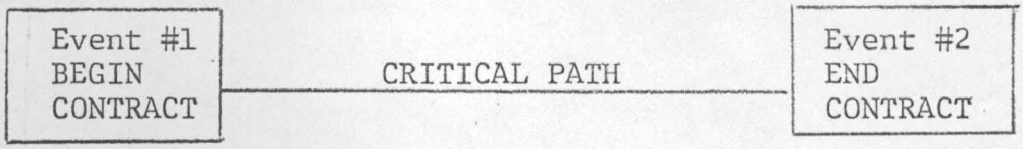
Frank Williams
Hope you keep Mr Zwerg of Speaker's office up to date on this B

7w/9/28

B 10/28

NOTES 10-28-63 HOELZER

1. GE CONTRACT: We have received from NASA Headquarters an approved procurement plan for securing competition on our in-house support contract. We discover that not only must we have an incentive type contract, but that it must also be PERTed! We suggest the following PERT network:



The Source Evaluation Board is as follows:

Mr. Carl Prince, MSFC, Chairman - COMP
Mr. C. L. Bradshaw, MSFC - COMP
Mr. W. H. Fortenberry, MSFC - COMP
Mr. R. L. Wesson, MSFC - COMP
Mr. Andrew J. Wood, MSFC - PR
Mr. W. J. Miller, MSFC - PR
Mr. Ray Cline, MSFC - PR
Mr. William L. Lovejoy, MLV, Hdq.
Mr. Carl Schreiber, D-1, Hdq.

Since Seamans is the appointing authority, Webb will make the final selection.

NOTES 10-28-63 JAMES

SATURN I - SA-5: S-IV-5 Contamination Summary - During the S-IV-5 propulsion leak checks at AMR the LH_2 inlet valves on Engines #2 & #6 were found to be leaking. When these valves were replaced there was some contamination found which consisted of polyurethane and lefko-weld flakes. These flakes are coming from the LH_2 low pressure duct elbows, located around the LH_2 tank. During installation of the LH_2 insulation the polyurethane is overlapped into the LH_2 elbows downstream of the filter screens. When cryogenics come in contact with this area the flaking action occurs with the particles being injected into the engine inlet valve. DAC is presently attempting to clean the elbows and engine ducts to prevent further flaking action when propellant loading occurs. A P&W representative took a portion of this contamination to their plant and injected it into an engine. No harmful results were noted in the 60 second firing. Further investigations are underway. The decisions reached on 10-25-63 were to clean the thrust control servo supply orifice lines and the cooldown valve signal lines on all six engines. The LH_2 inlet valves will also be replaced on all engines. The LH_2 pump inlet housing on one engine was removed and particles were found. No additional engine housing will be removed. As an added assurance a screen will be placed in each LH_2 low pressure duct downstream of the LH_2 tank screen, but upstream of the engine inlet valve. Corrective action is also being taken on subsequent S-IV stage.

S-I STAGE: Stop procurement actions have been issued on S-I-111 and subs. In-house CCSD effort is at a minimum due to manpower utilization on S-I-8. With a decision on program termination or target schedule implementation, schedules will be adjusted accordingly. CCSD is voluntarily delaying S-I-111 clustering from Oct. 29 until Nov. 4. If no decision is rendered on SATURN I Program Termination by Nov. 3, action will be taken to delay start of clustering of S-I-111 further as required. This can be done with little probability of overall schedule effect, since clustering on Oct. 29 is to meet the present OMSF schedule and is considerably ahead of the required clustering date for the MSFC target schedule.

SATURN IB: S-IVB/IB Evaluation Team - At the request of NASA Headquarters a combined NASA Headquarters - MSFC evaluation team has been established to review the S-IVB/IB stage to validate the availability of the stage to meet the MSFC target schedule. The team is composed of MSFC representatives from IO (IB Project Office & Facilities), ASTR, P&VE, TEST, and QUAL. Headquarter representatives from ML, MLVV, MLVI, and MI. The team arrived at DAC on 10-24-63,and a DAC presentation was begun on 10-25-63, which included the following: General Program Review; Battleship Program; Structural Test Program; Engineering Development System Integration Lab; All Systems; Auxiliary Propulsion System; GSE; Quality Test Program; Vehicle 201 thru 204; and Facilities. The review teams will conclude their discussions with DAC on Oct. 28 and prepare their report for forwarding to OMSF by Oct. 31.

FW 10/28

B10/29

NOTES 10-28-63 Koelle

1. OMSF FUNDING: This Monday I will be in Washington for a meeting with Ed Gray (Director, Advanced Studies), Max Faget and Georg von Tiesenhausen to take another pass at our FY 1964 budget. Ed Gray (formerly Boeing) has now been in his new job two months and wants to redistribute the funds. I hope we will come out all right. It is interesting to note that we have changed our Headquarters counterparts (bosses) nine times within three years, and all of them have definite ideas as to how to cut the cake. We have survived this rapid change of environment, but it takes a great deal of our energy - which we could use to make technical progress at a more rapid rate - to smooth the waves. (This is no complaint, but I am supposed to report on things of general interest.)

2. NOVA ORIENTATION MEETING: On October 31 and November 1, we will have our orientation meeting with Martin/Baltimore on the next phase of the NOVA Study (12 months, 1.5 million dollars). You remember that this will emphasize the application and justification of a new large launch vehicle in contrast to the previous phases which concentrated on design trade-offs.

FW 10/28

NOTES 10-28-63 KUERS B 10/29

1. Saturn V, S-IC Stage:

a. The Boeing proposal to introduce the light weight thrust structure right after the static firing vehicle, to be effective on all subsequent structures, has been thoroughly analysed. It was found that duplication of sub-assembly and final assembly tooling for parallel operation would not be required to make this early introduction of this new design possible. Substantial effort and cost can thus be saved. The critical areas are rather in fabrication of components and procurement of long lead time items. We have discussed these points with Boeing in a meeting last Friday. Basically we have accepted the proposal and Boeing (Mr. Nelson and Mr. Coenen) has agreed to our view points. We have also agreed to relax our controls and give Boeing a free hand in accomplishing this task. Judging from past experience in the performance of work by Boeing, I still believe that the schedule for introduction of the light weight structure is very marginal and not quite realistic (see paragraphs b and c). ✓

b. No improvement is seen in delivery of thrust structure parts for -T from Boeing. The third outer engine support was scrapped in Wichita last week which indicates at least another two week delay before the thrust structure assembly can start. The pacing items, however, are the skin panel assemblies from Michoud for which no schedule improvement is in sight. ✓

c. Change Action Memos (CAM's) #77,92,93,94, and 96 combined are to cause a total slide of 6 months on the structural test fin and fairing. Tooling and fabrication are the complete responsibility of Boeing. ✓

*FW 2. Saturn IB, S-IVB Stage: To alleviate the critical skin mill capacity problem (which exists also for the S-II and S-IC stages) we have succeeded in allocating a G&L (Giddings and Lewis) non tape controlled skin mill from the Air Force. This machine has been put in storage by the Air Force but has not been declared as an excess machine tool. A special agreement has been made with the Air Force for utilization of this machine and DAC has now been authorized by P&C to procure this skin mill. ✓

FW 10/28

B 10/29

NOTES 10-28-63 MAUS

1. SIX/YEAR SATURN IB/V LAUNCH RATE ASSURANCE STUDY - On October 23, Dr. Rees received a request from Capt. Freitag on the six/year Saturn IB/V assurance program. Basic guidelines and assumptions: (1) provide more than minimum facility and production tooling support, (2) increase Launch Complex 39 capability from 8 to 12 launches per year to represent proper balance between cost and six/year launch assurance, (3) modify Launch Complex 34 to accommodate S-IB configuration thereby increasing launch potential from 6 to 10 per year, and (4) provide an additional vertical assembly building at Seal Beach to increase the rate from 6 to 9 to further assure 6 per year. ✓

   Capt. Freitag requests that an analysis be conducted to establish the production capability for each stage that represents the proper balance between reasonable costs and six/year assurance. We are to forward the package by November 8, with comments on the overall aspects of the program and recommendations to insure effective implementation of the program. ✓

2. LAUNCH VEHICLES FOR LUNAR LANDING PROGRAM - Dr. Seamans has issued three memos requesting re-evaluation of Launch Vehicles for the Lunar Landing Program as follows:

   (1) "Earth Orbit Program in Support of Manned Lunar Landing" addressed to Dr. Mueller.

   (2) "Titan III - Possible Use for NASA Missions" addressed to Mr. Fleming.

   (3) "Re-examination of NASA Launch Vehicle Program" addressed to Dr. Mueller.

   In support of the latter memo, MSFC has been requested to furnish imputs with respect to:

   a. A determination of whether the total number of launches scheduled is realistic to meet or exceed minimum requirements,
   b. Examine definitions of all missions, and adequacy of provisions for backup and spare vehicles, and
   c. Recommendation of additional missions which should realistically be considered part of the "hard-core" lunar program.

   The inputs are presently being generated. ✓

FW 10/28

B 10/29

NOTES 10-28-63 MRAZEK

1. S-IV-5 FUEL AND ENGINE SYSTEMS CONTAMINATION: Checkout of the S-IV-5 flight vehicle at Atlantic Missile Range indicated high leakage of the fuel inlet valves on two engines. These valves were removed and inspected. Particles, later determined to be polyurethane of the type used in the fuel tank, were found in both valves. Polyurethane and epoxy were also found downstream of the fuel tank sump screens in all of the six fuel suction line inlets.*

All inlet valves have been replaced. One pump was opened and two small flakes were found. (Additional pumps were not disassembled.) All suction lines were scraped and cleaned with the whole system purged. New inlet valve screens are to be incorporated as soon as possible. All engine systems are being reassembled and the engine leak test will be made again. Tests are being performed at Pratt and Whitney Aircraft with the contaminants to see if any further problems exist. ✓

2. S-I-7 SECOND STATIC TEST SUCCESSFUL: All vehicle systems performed satisfactorily for a duration of 144.88 seconds. No leakage was detected in the system, and post-test inspection revealed no hardware damage. All engines performed within the 188K ± three percent thrust limit. ✓

3. VIBRATION DATA REDUCTION: Beginning with SA-7 static test, digital vibration analysis techniques, employing IBM 7094 and SC 4020, were attempted. The output is in the form of spectra analysis along with density functions and distribution functions. The complete data reduction requires a lapsed time of less than six hours, representing a major advancement in the state-of-the-art of vibration data reduction. ✓

4. CRACKED S-I-5 TUBE FITTINGS: Cracked sleeves have been found in the fittings of twenty-one tube assemblies at Atlantic Missile Range. New sleeves will be installed in the fittings of the more critical lines. On less critical lines, fittings will be inspected (visual and leak inspection) and, as a result of the inspection, will be approved or replaced. Parts in stock do not conform with the latest specifications, but arrangements have been made with Manufacturing Engineering Laboratory for replacement sleeves. ✓

5. S-IC-T TASK FORCE FORMATION: A new S-IC-T Task Force, to expedite S-IC-T operation, has been established with Mr. Heimberg as chairman and Mr. Urlaub as co-chairman. Members are drawn from this Laboratory, Test Laboratory, Manufacturing Engineering Laboratory, Astrionics Laboratory, Quality and Reliability Assurance Laboratory, Saturn V Project Office (I-V-S-IC), Michoud, and The Boeing Company. ✓

6. IMPACT OF PLAN VI ON S-IC DUCTING: A backup for the S-IC ducting has become a definite requirement as a result of the impact of Plan VI. Action is being taken by the S-IC Project Engineer to fund this requirement. ✓

*Pratt & Whitney Aircraft has made eight engine tests for a total of 1731 seconds. They have used 2.5 grams of the injested material. No problems at all. ✓

NOTES 10/28/63 RUDOLPH

1. Saturn V: We are unofficially attempting to execute the FY 64 program on the basis of the MSFC Target Schedule #3, per your decision in September 1963. Because we will have to restrict funding to the contractor on an "official" basis, we are in fact automatically giving a relief from approved contract schedules. We are in a bind in so doing because we cannot contractually relieve the contractor of the approved schedule. We solicit your help in getting OMSF approval to the MSFC target schedule.

2. S-IC Stage: It is intended to distribute within MSFC during the week a coordinated Plan VI which reflects the MSFC Target Schedule #3.

When the S&ID Master Interface Gage for S-IC-T was disassembled, re-assembled, and measured, different measurements existed which could cause mis-match of mating parts. The possibility exists that the gage will have to be returned to S&ID for rework. No schedule impact is anticipated at this time.

3. The NASA Contracting Officer at S&ID has approved a sub-contract (estimated cost of $1,207,362) to American Machine Foundry Co., Stanford, Conn., for procurement of S-II Stage transporters. Also approved was a sub-contract (estimated cost of $232,201) by S&ID to Brown Engineering for 13 multiplexer assemblies in accordance with Hoberg's planning.

The first tool proofing bulkhead (strip-seal design) gore was high energy formed last week and is now in chem mill.

4. Instrument Unit: The preparation of comments and plan to phase IBM into the Saturn IB and V integration and checkout of the Instrument Unit Program has started. Target data for completion is November 1, 1963 (reference Dr. Mueller's letter).

The letter contracts to IBM for the Data Adapter and Guidance Computer have been accepted by IBM, returned to MSFC, and are now in effect.

The preparation of the Procurement Plan for the fuel cells has begun. The target date for return of the plan approved by NASA Headquarters is February 15, 1964. Every effort will be made to get the plan approved earlier to facilitate use on SA-201.

The Procurement Plan for the SA-124 platform is in preparation now and will be forwarded to NASA Headquarters week of November 4, 1963.

5. Vehicle GSE: Impact to Budget & Schedules ($1.9 M and 18 weeks slippage based on 10/30/63 go-ahead), as a result of NASA Headquarters' imposing MPC-250-1 MIL-D-70327 and other specifications on the RCA Computer Contract, was discussed with RCA. A day-by-day delay in go-ahead directions to RCA results in a like slippage in delivery. Action is being taken to secure a decision by NASA Headquarters to proceed on MSFC's interpretation of these new requirements.

B 10/29 That's O.K. B

A.R. Dr. Mueller promised to approve new schedule as soon as "total package" (LV + S/C) after Sat I reorientation has been impacted. B

A.R. Dr. Mueller told me that a 6 hr operating time for the SIV B fuel cell was too short to make it lighter than batteries. Suggest ASTR prepare a short write-up to support their weight-saving claims. B

FW 10/28

B 10/29

NOTES - 10-28-63-SHEPHERD

No Notes

B10/29

NOTES 10-28-63 Stuhlinger

1. FY-64 RESEARCH AND TECHNOLOGY PROGRAM: In several instances in past weeks, members of RPL and other laboratories jointly succeeded in obtaining authorization for some individual research tasks from program offices after detailed presentations. In this way, we were able to obtain additional research funds for P&VE, ME and COMP above the limited appropriations received earlier during this FY. Another attempt for the lunar supporting research program, which is still essentially unfunded, is presently underway; almost all laboratories have a part in that program. Even with these additional funding authorizations, total allocations for MSFC are considerably below the guidelines we received in August. We are preparing an information sheet of the supporting research program status for you for the middle of November.

2. ALSS SCIENTIFIC MISSION OPERATIONAL PLAN: RPL's work on defining a scientific mission operational plan for ALSS will result in a rough and first cut at a mission plan for a two-week lunar mission by the first of December. This mission plan will be presented to Mr. de Fries.

It is interesting to note that MSC let a $195,000, 10 months contract to Texas Instruments to define scientific measurements to be made during a four-hour scientific mission for the two LEM astronauts. This study will be somewhat analogous to the study covered in our Bucher-Weber report. The Bucher-Weber report assumed, however, that logistic support will be available from a separately landed logistic payload.

3. VISIT TO FAIRCHILD STRATOS CORPORATION: Dr. Rees and 10 other MSFC representatives visited FSC on October 24. We saw the facilities for the Meteoroid Measurement Satellite and discussed the status of the project. Areas that still require particular attention at present are the dynamic testing of the MMS and the radiation damage effect on the meteoroid detectors. The overall impression of the project status upon MSFC members was positive. Other FSC capabilities were discussed.

4. CHANGE OF ASSIGNMENT: Art Thompson, Chief of the Technology Utilization Office and of the Systems and Instrumentation Branch, RPL, accepted the position of Saturn IB Stage Manager under Lee James at IO. Disposition of the Technology Utilization Office and of the Systems and Instrumentation Branch has not been fully decided yet.